Bell Work
26-April-17

What are the strong acids you must know?

What is the conjugate base* in the reaction below?

$HC_2H_3O_2 + H_2O \rightarrow H_3O^+ + C_2H_3O_2^-$

What do bases taste like?

* "**conjugate base** is merely what is left after an acid has donated a proton in a chemical reaction."

https://en.wikipedia.org/wiki/Conjugate_acid

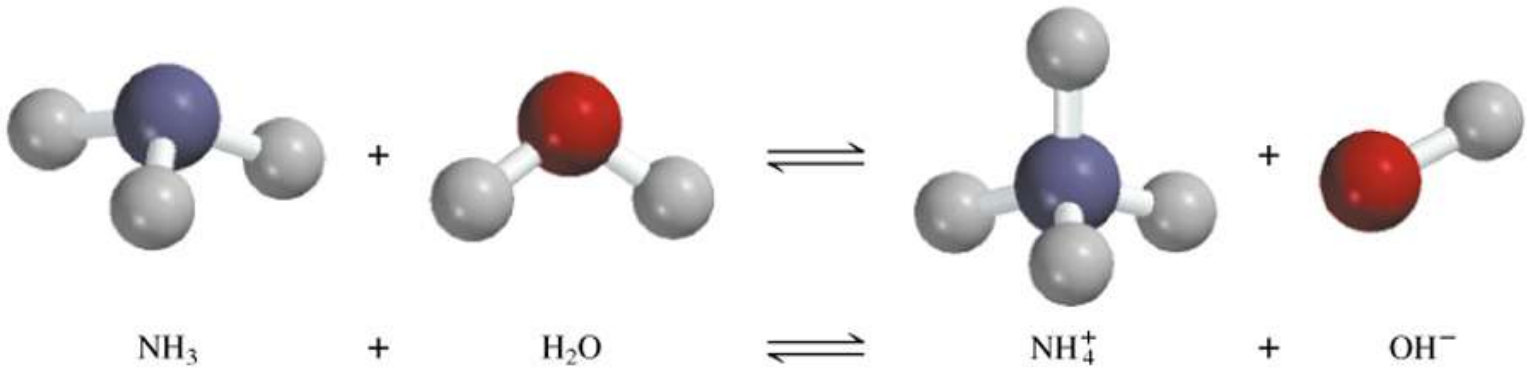
Agenda

pH

pH → $[H^+]$

Objective:

You will start to look at calculating pH and $[H^+]$ and be able to describe the pH scale.



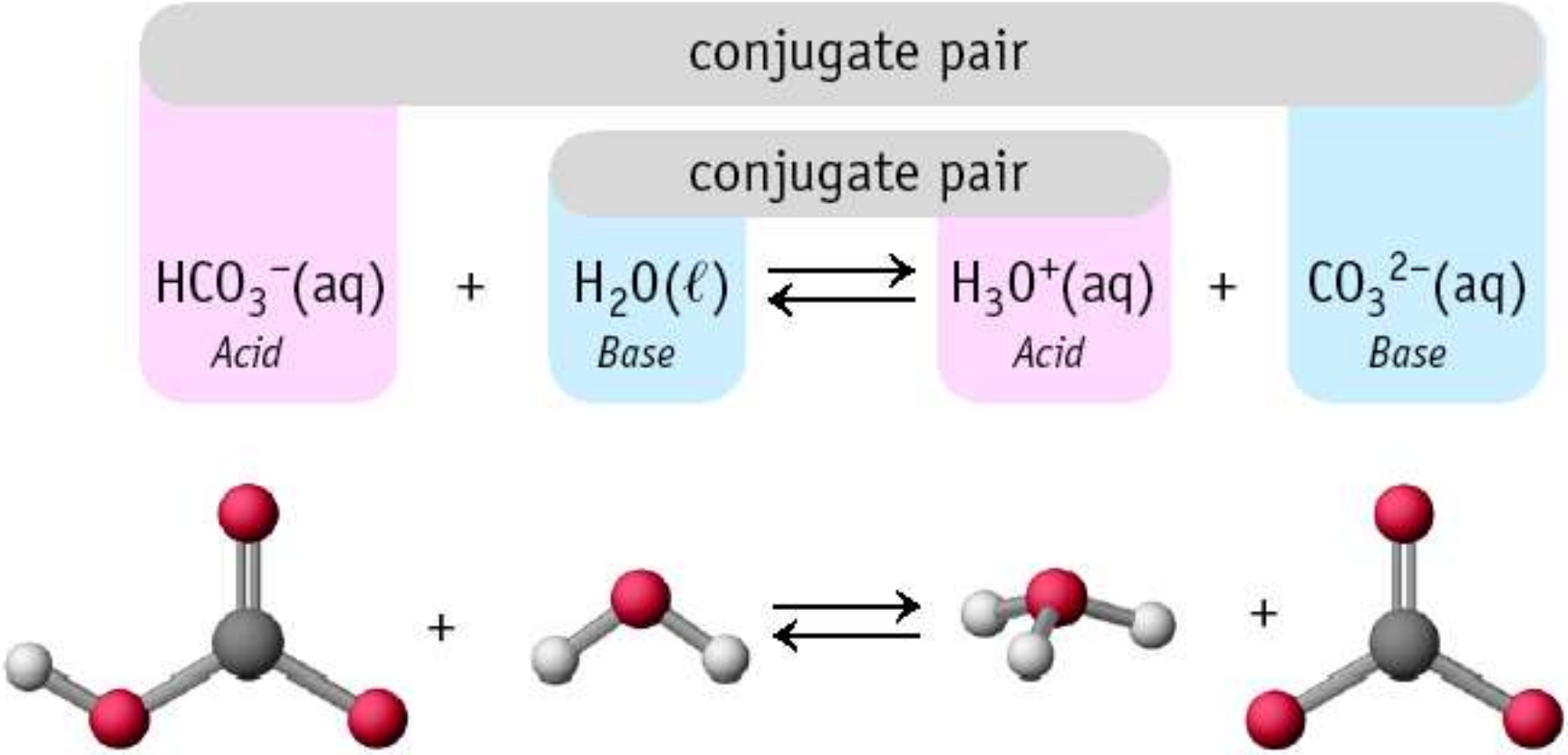
$NH_3 + H_2O \rightarrow NH_4^+ + OH^-$

base **acid** **conjugate acid** **conjugate base**

conjugate acid: substance formed when base gains a hydrogen ion

conjugate base: substance formed when an acid loses a hydrogen ion

Conjugate Pairs



Learning Check!

Label the acid, base, conjugate acid, and conjugate base in each reaction:

$$HCl + OH^- \rightarrow Cl^- + H_2O$$

$$H_2O + H_2SO_4 \rightarrow HSO_4^- + H_3O^+$$

For most Acid Bases Rxns

The generic equation for most acid base rxn is:

$$HA + BOH \rightarrow BA + H_2O$$

You will get a salt and water out of an acid base rxn!

You try… write out the products:

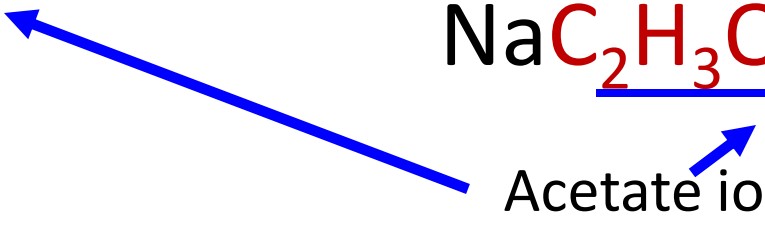
$HA + BOH \rightarrow BA + H_2O$

You will get a salt and water out of an acid base rxn!

1) $HCl + NaOH \rightarrow NaCl + H_2O$

2) $HNO_3 + KOH \rightarrow KNO_3 + H_2O$

3) $HC_2H_3O_2 + NaOH \rightarrow NaC_2H_3O_2 + H_2O$

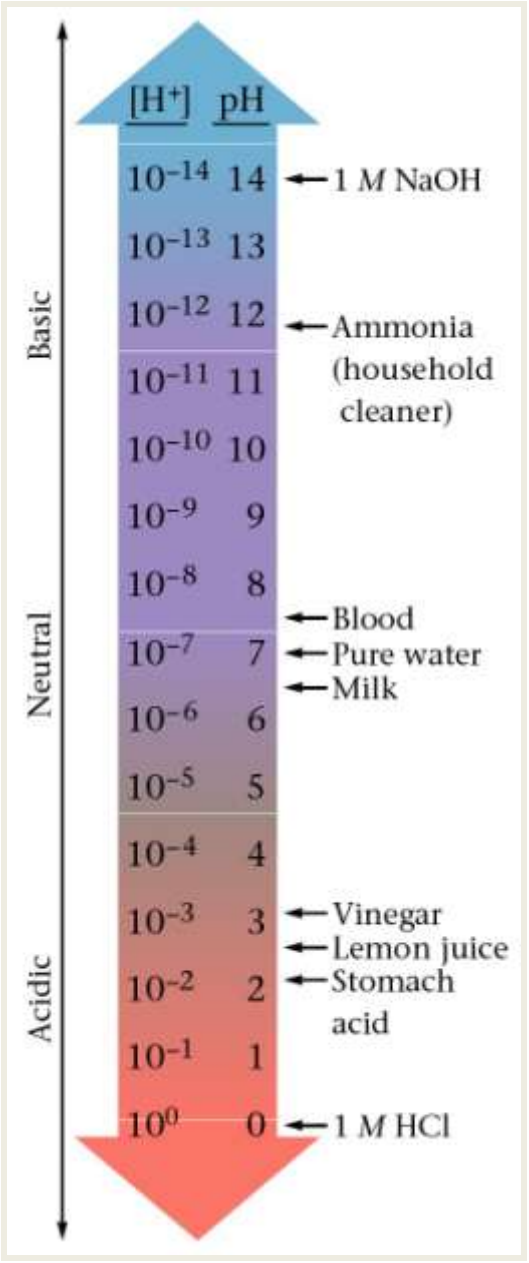


pH scale = way of expressing the strength of acids & bases. Instead of using very small #'s, we just use the NEGATIVE power of 10 on the Molarity of the H^+ (or OH^-) ion.

Under 7 = acid

7 = neutral

Over 7 = base



pH of Common Substances

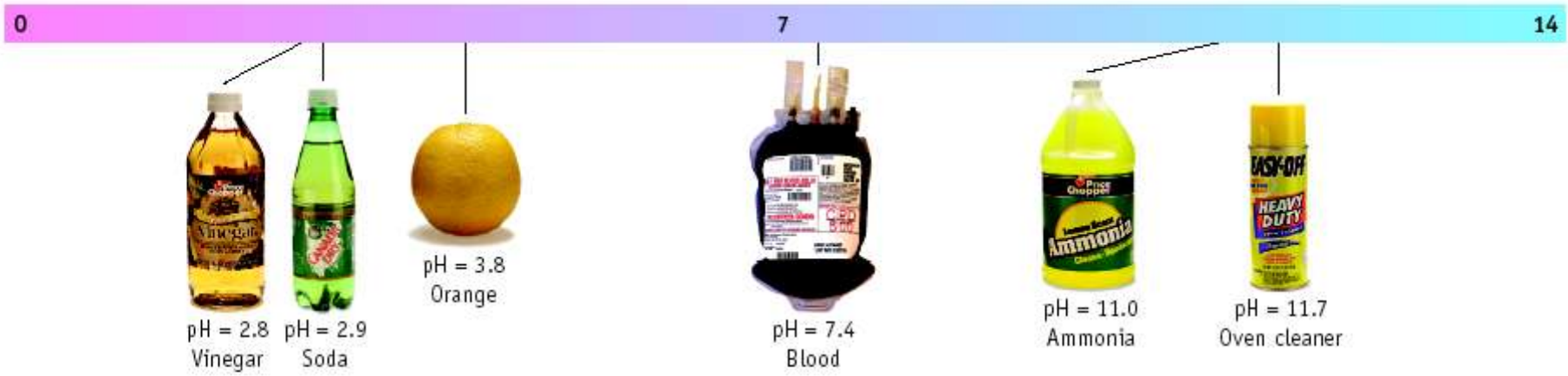


Figure 5.17 pH values of some common substances. Here the "bar" is colored red at one end and blue at the other. These are the colors of litmus paper, commonly used in the laboratory to decide if a solution is acidic (litmus is red) or basic (litmus is blue). *(Charles D. Winters)*

Strong Acids and Bases

"100%" dissociation. Strong Acid and base dissociate just like a strong electrolyte, as such they are classified as strong electrolytes

Dissociation: The splitting of a molecule into smaller molecules, atoms, or ions, especially by a reversible process, ex.

$HCl \rightarrow H^+ + Cl^-$, $Ca(OH)_2 \rightarrow Ca^{2+} + OH^-$

Calculating the pH

$$pH = - \log [H^+]$$

$$pH = - \log [H_3O^+]$$

(Remember that the [ ] mean Molarity)

Example: If $[H^+] = 1x10^{-10}$

$pH = - \log 1 \times 10^{-10}$

$pH = - (- 10)$

$pH = 10$

For a strong acid [H+] ~ the molarity of the solution

Calculating the pH

pH = - log [H+]

(Remember that the [ ] mean Molarity)

Example: If $[H^+] = 1.8 \times 10^{-5}$

pH = - log 1.8×10^{-5}

pH = - (- 4.74)

pH = 4.74

Try These!

Find the pH of these:

1) A 0.15 M solution of Hydrochloric acid
2) A 3.00×10^{-7} M solution of Nitric acid
3) A 6.0M solution of Sulfuric acid

pH Cals. Solving for [H+]

If the pH of Coke is 3.12, $[H^+]$ = ???

Because pH = - log $[H^+]$ then

- pH = log $[H^+]$

Take antilog (10^x) of both sides and get

$10^{-pH} = [H^+]$

$[H^+] = 10^{-3.12} = 7.6 \times 10^{-4}$ M

*** to find antilog on your calculator, look for "Shift" or "2nd function" and then the "log" button

Optional Home Work

- Read p.607-610 complete #11 and 13